



Homemade Valveless Pulse Jet

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TOOLS:

- [Power drill, drill press, or Dremel \(1\)](#)



PARTS:

- [RC Glow Plug \(1\)](#)
- [1/4" plastic tubing \(2'\)](#)
- [metric Hex nut \(1\)](#)
[large enough to secure the Glow Plug you buy](#)
- [1/4" tubing \(2'\)](#)
- [Liquid welder \(1\)](#)
[glue for metals](#)
- [1" x 12" pipe \(1\)](#)
- [1/2" x 5" pipe \(1\)](#)
- [Electrical conduit box \(1\)](#)
- [Electrical conduit box cover \(1\)](#)
- [Isopropyl alcohol \(32 fl oz\)](#)
- [Spray bottle \(1\)](#)
- [Air compressor \(1\)](#)

SUMMARY

In 1906 the first pulsejet was patented and since then this type of engine has provided

entertainment as well as opportunity for innovation and improvement. The way a pulsejet works is actually very simple. With a valveless design (which this is), fuel and air are directed into a combustion chamber. The fuel is ignited and flame exits the exhaust tube and creates a vacuum in the combustion chamber which draws more fuel and fresh air in. The ignition source then ignites the fresh fuel and the cycle repeats.

This instruction manual will provide details on constructing and operating a pulsejet that runs on isopropyl alcohol. The engine can be made from items that can mostly be found at Lowe's and other hardware stores, if not just lying around the house.

Step 1 — Homemade Valveless Pulse Jet



- Beginning with the conduit box, drill a hole in one side (without the punch holes) to match the larger pipe (which will be the exhaust tube) and a hole in one of the two nearest corners for the smaller pipe (which will be the inlet tube).

Step 2



- Once the holes have been drilled, take the scrap metal and liquid-weld it to the openings on the conduit box.

Step 3



- After the liquid weld has dried, screw the inlet and exhaust tubes into the holes drilled for them. Use the liquid weld to secure them in place.

Step 4



- Inserting the glow plug into the pulsejet will be fairly simple. There are a number of small holes already made in the conduit box. Insert the glow plug into one of these below the inlet and exhaust tube. This will allow the fuel and air to mix directly over the glow plug.

Step 5



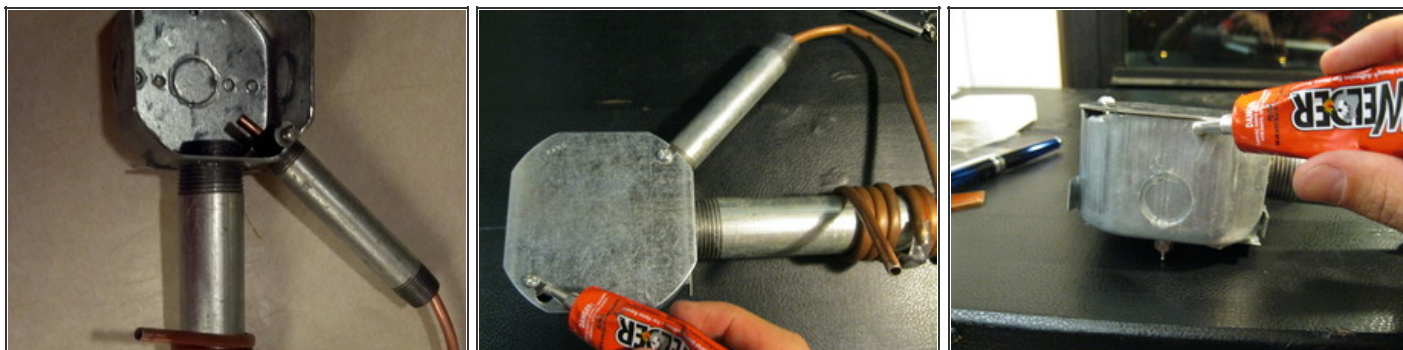
- To feed fuel into the combustion chamber, begin by feeding a length of copper tubing down the inlet tube, stopping before contact with the glow plug. After this has been done, make a bend that directs the rest of the copper tubing down to the exhaust tube. Next, wrap the remaining length around the exhaust tube.

Step 6



- Since the copper tubing that was available only came in two-foot segments when this prototype was made, and more than two feet is needed, multiple tubes were used. They were connected by a segment of plastic tubing.

Step 7



- After the copper tube has been twisted around the exhaust tube, make sure the end inside the combustion chamber lines up with the glow plug. Then the cover is ready to be put on the conduit box. Once the cover is on and the screws have been tightened, secure in place with the liquid weld.

Step 8



- Take the bottle of isopropyl alcohol and make two holes in it; one at the base of the bottle, and the other just below the neck of the bottle. In the hole at the base insert the plastic tubing and liquid-weld or hot glue the tube in place. In the other hole, insert the pin for the bike pump and liquid-weld in place.

Step 9



- Now is the time to connect everything together. Insert the plastic tubing from the spray bottle into the copper tubing that has been wound around the tail pipe. Connect a glow plug starter to the glow plug. Fill the bottle with isopropyl alcohol and connect the bike pump to it


Step 10



- Set the engine up outside so that it is stable and will not tip over. Using an air compressor, blow air into the tailpipe. This will create a high pressure inside of the combustion chamber. As this is happening, with the glow plug hot, pump a bit of isopropyl alcohol into the engine to start the combustion process.

Step 11



- If the fuel is properly sprayed into the conduit box (which means that you may need to create a nozzle) and the weather is warm enough ($> 50^{\circ}\text{F}$) then combustion should occur.
- Be aware that the heat of a running engine could ignite excess fuel spillage. 
- To improve efficiency and help to start the engine we recommend that you spend some time finding a way to atomize the fuel coming into the combustion chamber rather than just letting it flow in from the fuel tank. This project does not cover how to do that, but be creative and you will have fun figuring it out.

This document was last generated on 2012-12-19 05:05:09 PM.